

Message

From: Bo Stewart [Bo@praxis-enviro.com]
Sent: 6/23/2016 11:03:06 PM
To: d'Almeida, Carolyn K. [dAlmeida.Carolyn@epa.gov]; Dan Pope [DPope@css-dynamac.com]; Wayne Miller [Miller.Wayne@azdeq.gov]
CC: Davis, Eva [Davis.Eva@epa.gov]
Subject: Re: 2016-6-22 - wafb - FYI - Sodium Sulfate emulsifier summation - ST012 EBR - bstewart praxis summary

Sorry if I'm confusing things, but the whole surfactant issue on emulsions vs mobilization, etc is confusing and complicated and changes with pH, temperature, salinity, etc. I come from a post-oxidant world and only pretend to be a chemist.

Sulfate improves the anaerobic degradation rate. I shouldn't comment beyond that.

Higher temperature increases dissolution rates and the potential for plume growth if not accompanied by extraction.

On 6/23/2016 3:52 PM, d'Almeida, Carolyn K. wrote:

Sorry, but all of these words seem synonyms for "mobilize". am I wrong to think that?

From: Dan Pope [mailto:DPope@css-dynamac.com]
Sent: Thursday, June 23, 2016 3:49 PM
To: d'Almeida, Carolyn K. <dAlmeida.Carolyn@epa.gov>; Wayne Miller <Miller.Wayne@azdeq.gov>; Bo <bo@praxis-enviro.com>
Cc: Davis, Eva <Davis.Eva@epa.gov>
Subject: RE: 2016-6-22 - wafb - FYI - Sodium Sulfate emulsifier summation - ST012 EBR - bstewart praxis summary

That's interesting. We use sodium sulfate in the lab to break emulsions.

From: d'Almeida, Carolyn K. [mailto:dAlmeida.Carolyn@epa.gov]
Sent: Thursday, June 23, 2016 5:10 PM
To: Wayne Miller; Bo
Cc: Davis, Eva; Dan Pope
Subject: RE: 2016-6-22 - wafb - FYI - Sodium Sulfate emulsifier summation - ST012 EBR - bstewart praxis summary

Thank you Bo, this is much clearer now.

I am still hung up on dissolution vs dispersion and very concerned about potential to spread much faster than degrade.

From: Wayne Miller [mailto:Miller.Wayne@azdeq.gov]
Sent: Thursday, June 23, 2016 3:03 PM
To: d'Almeida, Carolyn K. <dAlmeida.Carolyn@epa.gov>
Subject: 2016-6-22 - wafb - FYI - Sodium Sulfate emulsifier summation - ST012 EBR - bstewart praxis summary

FYI – Summation provided to me by UXO Pro/Praxis

From: Bo Stewart [<mailto:Bo@praxis-enviro.com>]
Sent: Wednesday, June 22, 2016 5:28 PM
To: Wayne Miller <Miller.Wayne@azdeq.gov>; steve <steve@uxopro.com>
Subject: 2016-6-22 - wafb - Sodium Sulfate emulsifier - ST012 SEE to EBR - bstewart praxis

Don described it this way on the call today, somewhat. The sulfate has surfactant properties but not really for mobilizing NAPL as much as emulsifying to increase surface area for dissolution and bacteria interaction. The sulfate makes the compounds available to the bacteria (abiotic). But this requires contact between the sulfate and NAPL. This is all relatively unproven for a field application like this one but the process is well kno. The associated biological process is anaerobic and slow; therefore, increasing the rate by a factor of 2 to 5 (published literature) still yields a slow process compared to aerobic degradation processes. I have stayed out of this issue and don't know why air sparging was not considered or was eliminated.

More commonly, persulfate is injected as an oxidant and the reaction products include sulfate to increase biological degradation after the reaction. It can also be combined with calcium peroxide to prolong the effect. But this can get expensive ...

On 6/22/2016 4:51 PM, Wayne Miller wrote:



FYI -

From: d'Almeida, Carolyn K. [<mailto:dAlmeida.Carolyn@epa.gov>]
Sent: Wednesday, June 22, 2016 4:43 PM
To: Davis, Eva <Davis.Eva@epa.gov>; Dan Pope <DPope@css-dynamac.com>; Wayne Miller <Miller.Wayne@azdeq.gov>
Subject: 2016-6-22 - wafb - Sodium Sulfate is mostly a surfactant - ST012 SEE to EBR - cda epa

Talking with Rosemarie's bio expert and checking on line, it appears to be more of a abiotic reaction

Carolyn d'Almeida
Remedial Project Manager
Federal Facilities Branch (SFD 8-1)
US EPA Region 9
(415) 972-3150

"Because a waste is a terrible thing to mind..."

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Lloyd "Bo" Stewart, PhD, PE
Praxis Environmental Tech., Inc.

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Lloyd "Bo" Stewart, PhD, PE
Praxis Environmental Tech., Inc.